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15	TIPLIANG ING	:	CASE NO.: 3:22-cv-07789-WHO
16	TARI LABS, LLC,	:	DECLARATION OF
17	Plaintiff,	:	OLAOLUWA OSUNTOKUN IN
.	,	:	<b>OPPOSITION TO PLAINTIFF'S</b>
18	-against-	:	MOTION FOR A TEMPORARY
19	LIGHTNING LABS, INC.	:	RESTRAINING ORDER
20	LIGHTWING LADS, INC.	:	
	Defendant.	:	
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Case No.: 3:22-cv-07789-WHO
Declaration of Olaoluwa Osuntokun in Opposition to Plaintiff's Motion for a Temporary Restraining Order

I, Olaoluwa Osuntokun, hereby declare:

- 1. I am a co-founder and the Chief Technology Officer ("CTO") at Lightning Labs, Inc. ("Lightning Labs").
  - 2. I am a resident of the State of California, and I am over the age of eighteen.
- 3. I submit this declaration in opposition to Plaintiff's motion for a temporary restraining order based on my personal knowledge and a review of records and information in the course of my role as co-founder and CTO of Lightning Labs.

### My Personal Background

- 4. I was born in Nigeria and immigrated to the United States at five years old. I had always been interested in technology—initially in video games. In fact, the origin of my well known "roasbeef" handle (i.e., my public username that I use on various websites) is rooted in my teenage experiences with video games—I was eating a roast beef sandwich and needed a username for a video game, but "roastbeef" was unavailable, so I decided to drop the "t."
- 5. My interest in technology expanded beyond video games when I entered college and I was first exposed to computer science. I took my first computer science course my freshman year in college. I loved my computer science courses. I was fascinated by learning how to create things with computer code, and gaining a new understanding of how video games worked. I also became interested in open-source software, learning about software development and the way in which open communities of developers work and collaborate across boundaries. I decided to pursue software development as a career.
- 6. While in college, I spent three summers as an intern at Google in the Bay Area doing various types of software development. I received my B.S. in computer science and later an M.S. in computer science with a focus on applied cryptography from UC Santa Barbara, a university known for its strength in cryptography. As a graduate student, I was awarded the school's Best Computer Science Teaching Assistant Award.

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- 7. Since co-founding and serving as the CTO of Lightning Labs, I have received other accolades for my work in computer science, including being named to Forbes' 2019 "30 Under 30" list in the Finance category. A true and correct copy of the Forbes profile of me is attached as Exhibit 1.
- 8. In 2022, I co-authored a highly technical book called *Mastering the Lightning Network:* A Second Layer Blockchain Protocol for Instant Bitcoin Payments, published by O'Reilly Media. Amazon describes the book as follows: "Ideal for developers, systems architects, investors, and entrepreneurs looking to gain a better understanding of LN, this book demonstrates why experts consider LN a critical solution to Bitcoin's scalability problem. You'll learn how LN has the potential to support far more transactions than today's financial networks." Attached as Exhibit 2 is a true and correct copy of the Amazon listing for this book.

# **Lightning Labs**

- 9. I first met Elizabeth Stark in June 2015 at a Bitcoin developer meetup. At the time, I was already interested in Bitcoin and had been contributing to an open-source Bitcoin implementation called "btcd." In open-source software communities, like the one surrounding Bitcoin, such meetups are common ways for developers to meet, share ideas, and discuss projects. In the crypto space in particular, the Bitcoin developer community is full of brilliant, sophisticated developers who generally work exclusively on Bitcoin-related projects. There are separate developer communities for other blockchains, like Ethereum, that have very different code bases, features, and functionality than Bitcoin.
- 10. Elizabeth and I chatted at a bar after the Bitcoin developer meetup, where I introduced myself and she asked questions about my research and my work with other developers. I mentioned my interest in doing academic research related to the early technical proposal for what was being called "the Lightning Network," which would be built on the Bitcoin blockchain. Elizabeth and I met up several times that summer with other Bitcoin developers and discussed working together on open-source Lightning Network technology.

While Lightning Labs did not yet exist, Elizabeth was interested in starting a company to build the core technology for the Lightning Network.

- 11. Elizabeth proposed that I work with the Lightning Network developer team that would eventually become Lightning Labs while I was still in grad school, to help build out the initial version of the Lightning Network software. She told me they did not yet have funding, but they would pay me once they did. I agreed, because I was excited about the innovative potential of the Lightning Network. I am continually pursuing new research around cryptography and technical protocols, about which I am deeply passionate. Bitcoin fascinates me because it presents many technical intricacies to be studied and improved upon, and I understood that helping develop the early versions of the Lightning Network protocol would be embarking upon a new frontier for Bitcoin.
- 12. Over my winter break in 2015–16, I wrote the initial key components of what is now the open-source "Ind" software that powers the Lightning Network. Lightning Labs officially launched soon thereafter, in January 2016. At the time, I had an offer to join Google as a software developer upon graduation, but I instead chose to continue working alongside Elizabeth to build software for the Lightning Network as a co-founder of Lightning Labs. I moved to San Francisco in June 2016.
- 13. As CTO of Lightning Labs, I have built out the leading developer software for the Lightning Network on Bitcoin including TARO, which I will discuss further below.
- 14. I also am known in the community for giving "lightning fast" talks about highly technical subjects. There is a common joke that anyone who listens to a video of me speaking needs to set it to 0.5x speed in order to slow down the audio enough to understand me.

### The TARO Protocol

## Bitcoin's Taproot Update and the Origins of the TARO Protocol

15. In late 2021, an update to the Bitcoin protocol called "Taproot" went live. When I started investigating Taproot, I realized that this new upgrade to Bitcoin could be

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used to unlock the ability to create new digital assets on both the Bitcoin blockchain and the Lightning Network in a new way that took up less space on the blockchain.

- 16. Historically, the cryptocurrency bitcoin (which is the native asset of the Bitcoin blockchain) was the principal digital asset that was used and exchanged on the Bitcoin blockchain. The Bitcoin developer community believes very strongly in the importance of bitcoin—the first cryptocurrency—and in its potential to revolutionize core aspects of money and finance, the same way the development of email revolutionized the way people communicate and send information. The Bitcoin developer community also generally dislikes and distrusts cryptocurrencies created on other blockchains, especially those that were created after the significant increase in attention to the cryptocurrency space in 2017–18 and have little to no value, especially when compared to bitcoin.
- 17. Given the Bitcoin developer community's distrust of digital assets issued on other blockchains, the Taproot update that will allow new digital assets to be created on the Bitcoin blockchain was an exciting moment. One important example of a new digital asset that Taproot will enable is a "stablecoin." Stablecoins are a particular type of digital asset that is intended to keep a stable value. The most common stablecoins are pegged to the U.S. dollar, so the value of the coin is designed to remain \$1. To date, most of the stablecoins that have been issued are on other blockchains (like Ethereum). Taproot—and the TARO protocol that we are developing—will allow companies to issue stablecoins on the Bitcoin blockchain.
- 18. After Taproot was released, I started researching and designing a new technical protocol (which ultimately became TARO) that would allow Bitcoin developers to create new digital assets on the Bitcoin blockchain and the Lightning Network. In summer 2021, I sent internal proposals to the Lightning Labs team about how the protocol could work. As is typical for the development of open-source software, I also worked to solicit feedback from the Bitcoin developer community through the proposals discussed below.

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19. To understand what TARO is, it is helpful to understand the concept of a technology stack. Every modern software application, especially those (like blockchains) that rely on the internet, relies on other technologies to function. In order to make a final, consumer-facing product, developers use other products (like programming languages, databases, and application programming interfaces, or APIs) that are part of the developerfacing technology stack to build their applications. Most people who use the digital asset bitcoin are just interested in sending value; they have no understanding of the underlying technology or software that powers the blockchain. This is the same way that most people who use email have no understanding of the protocols like IMAP (Internet Message Access Protocol) or SMTP (Simple Mail Transfer Protocol) that make email possible. The software developers who are knowledgeable about those technical protocols are highly sophisticated users who pay careful attention to what they're using—otherwise the software they're coding won't work.

20. On April 5, 2022, I released a series of in-depth technical documents (called "BIPs" or "Bitcoin Improvement Proposals") to the Bitcoin developer community proposing the TARO protocol. An example of one of these BIPs is publicly available at https://github.com/Roasbeef/bips/blob/bip-taro/bip-taro.mediawiki.

### The TARO Name

21. In late 2021 and early 2022, we were looking for a name for the developer protocol we were building. In March 2022, Elizabeth suggested the name "TARO." I loved that suggestion. Taro is a root vegetable that is an important food in Nigerian cuisine, and it's something I used to eat regularly as a child. I also liked that TARO could be easily understood as a reference to the Taproot upgrade to Bitcoin, which made the new protocol possible. I never once thought of TARI or Tari Labs as we were discussing the TARO name. I was very surprised to hear from Elizabeth that someone from Tari Labs was concerned about the TARO name, because I did not understand how a Bitcoin software developer who

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would use the TARO protocol could ever confuse it with what I have learned is Tari Labs' unreleased blockchain project built on an entirely different blockchain, Monero.

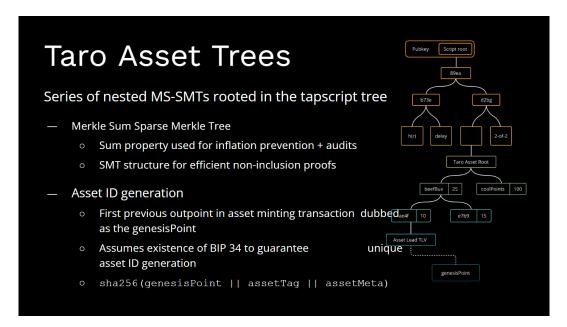
- 22. While deciding to name the protocol "TARO," we created the acronym "Taproot Asset Representation Overlay," which describes what the protocol does. I first publicly used that acronym in an April 5, 2022 blog post entitled "Taro: A Taproot Asset Representation Overlay," a true and correct copy of which is attached as Exhibit 3.
- 23. As a humorous nod to one of the meanings of "taro," I ate taro chips on stage during an April 6, 2022 keynote presentation regarding the TARO protocol at the Bitcoin 2022 Conference in Miami, Florida. A video of the presentation is available at https://youtu.be/veIuDwQTunw. Displayed below is a screenshot from that video, showing me holding my bag of taro chips.



During that presentation, I explained the significance of the name "TARO," 24. as shown in the slide below, which notes in the first bullet the connection between "taro" and "taproot." A true and correct copy of the slide deck I used is attached as Exhibit 4.



- 25. During the talk, I explained that taro is "eaten across many parts of the world—Africa, South America—it's actually one of the most ancient staple crops." I also explained that TARO is "a Taproot-powered protocol for issuing assets on the Bitcoin blockchain that can be transferred across the Lightning Network," tying the name back to the Taproot upgrade to Bitcoin.
- 26. During that same talk at the Bitcoin 2022 Conference, I explained the taproot-like structure of the TARO protocol, referred to as the "Taproot script tree" or the "Taro Asset Tree." A visualization of that taproot structure is shown in the graph below, from a slide used in the presentation.



### The Coding and Development of TARO

- 27. Most of Lightning Labs' coding—including for the TARO project—is done out in the open, visible to the public on Github, the leading platform for open-source software development and version control. For example, Lightning Labs is the lead developers of the open-source "lnd" software, the code base for which is publicly available at https://github.com/lightningnetwork/lnd. Similarly, TARO is an open-source protocol with all of the code publicly available on Github at https://github.com/lightninglabs/taro.
- 28. For any of these open-source projects, including TARO, any developers who are interested in working on the project can view, suggest, or contribute code. This is an important part of the open-source development process: it happens out in the open and everyone can see what everyone else is working on.
- 29. We publicly released the initial TARO code on September 28, 2022. Since that date, we have continually updated the TARO code, several times each week, and sometimes daily. Developers with no affiliation with Lightning Labs have also contributed and submitted code on Github, and those external contributors also assist with tasks like reviewing code, submitting bug reports, and requesting features publicly on Github.

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### Today, TARO Is Still in the Very Early Stages of Development

- 30. I understand that Tari Labs has alleged that a "launch" of the TARO protocol is "imminent," citing my statements on Twitter and at a conference in Israel, to argue that we have somehow suddenly changed the manner in which we are developing TARO. Tari Labs is wrong, and is taking my statements out of context to suggest something that simply isn't true. Nothing has changed, and none of the statements cited by Tari Labs indicate otherwise. Rather, as made clear by my statements in their full context, TARO is still in "alpha" stage for Bitcoin's "testnet" (concepts that are explained in more detail in the accompanying Declaration of Elizabeth Stark). The most important thing to understand about Bitcoin's "testnet" is that it is not the live version of the Bitcoin blockchain (called "mainnet") that is actually being used to record transactions. It is a separate developer-focused testing area for early-stage projects to ensure their software functions correctly before being integrated into the Bitcoin mainnet.
- 31. Although Tari Labs asserts that, earlier this month, I announced the launch of TARO by early- or mid-March 2022, my actual statement makes clear that I was only referencing a routine update to the alpha version of the TARO code for the Bitcoin testnet. On February 5, 2023, I spoke at a developer conference in Israel regarding the possibility of a novel cryptography technology called "zero knowledge proofs" and how such proofs could in the future interact with the TARO protocol. A video recording of my presentation is available at https://www.youtube.com/watch?v=pStJqHrJhVs. In the middle of my highly technical, nearly-30-minute speech, I mentioned in passing that "the next version 0.2 is coming out in like a month or so." This statement clearly refers to our forthcoming release of TARO testnet version 0.2 alpha, which Lightning Labs plans to release within approximately the next one or two months. Projects tagged "v0.2" were and remain publicly visible on the TARO Github page.
- 32. The Lightning Labs team often jokes that I have a reputation for being overly optimistic on release timelines, because software development always takes longer than you

expect. It's also important to understand what these words mean in the open-source

developer community in which I work. A "release" in the open-source software

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27 28 base. Prior to any "release," there will be daily or weekly code updates that have been continuously occurring in full public view. In the case of TARO version 0.2 alpha, the relevant code has been written and worked on within the <u>public</u> Github repository for the past five months. As we work to develop software, we and external contributors set goals by specifying features we would like to be included in the next "release." Those features are implemented into the public code on a rolling basis, so by the time the last feature from our list is completed, the majority of the features will already have been implemented into the public code. A version "release" thus serves simply as a symbolic milestone, in contrast to a full-scale "launch" of a completed product. 33. Contrary to Tari Labs' assertions, I also did not announce the release of the

development context is simply an arbitrary point-in-time demarcation of the state of the code

- TARO protocol on Twitter. On February 6, 2023, a software developer named Valentino Zertuche (who goes by the name ValentinoZ and uses the handle @vazertuche on Twitter) asked me on Twitter: "Any ETA as to when Taro will be available for testing?" Through a reply tweet, I responded: "[L]ast release was Nov 2022," providing a link to the Github page for version 0.1.1 alpha of TARO, and I went on to say that the "next release will have just about everything needed to fully get off the ground (universe server proof bootstrap, ability to mint assets into a group, support further issuance with the group key, etc)." Because I was talking to another developer about the highly technical features of TARO we were developing, I used the word "release" in the same sense I described above.
- 34. I understand that Tari Labs characterized this reply tweet as an "announcement" of an "imminent launch" of the TARO protocol. That characterization is entirely inaccurate. In this reply tweet, I was referring to our release of TARO version 0.2 alpha, as described above. In the TARO version 0.2 alpha, developers will be able to build software that interacts with groups of assets called "universes" on the Bitcoin test network,

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but this ability to create, send, and receive new assets—which is the core functionality of the TARO protocol—has existed within the software since the initial alpha version of TARO, which was publicly released for the Bitcoin test network back in September 2022. Again, version 0.2 alpha of TARO will be another early-stage version of the protocol that will only function on Bitcoin's testnet. My statement that the release "will have just about everything needed to fully get off the ground" is a reference to the fact that version 0.2 alpha will have more capability and more features for developers (like Mr. Zertuche) to test than the current version of the protocol, including the technical and relatively esoteric features I listed in the tweet (most of which have already been added to the code). My reply tweet to Mr. Zertuche does not indicate that a commercial release of the TARO protocol is imminent (it is not) or that we have "accelerated" of our development of TARO (we have not). Furthermore, Lightning Labs does not announce major product launches via my personal reply tweets, as Tari Labs suggests.

### The Bitcoin Software Developers Who Will Use the TARO Protocol

- 35. As with all of Lightning Labs' technologies, we are developing TARO for sophisticated Bitcoin software developers with an advanced understanding of Bitcoin blockchain architecture. We do not market TARO to ordinary consumers, nor do I expect that any ordinary consumer could understand the TARO code well enough to use it for any practical purpose.
- 36. The highly technical nature of my speech at the February 6, 2023 conference in Israel, referenced above, demonstrates that the presentation was directed toward highly sophisticated Bitcoin and cryptography developers. A representative sample of three slides that I used during the presentation are displayed below, making clear that the presentation was not suitable for ordinary consumers or even ordinary software developers but only highly sophisticated Bitcoin developers. A true and correct copy of the full slide deck from the presentation is attached as Exhibit 5.

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# Taro - Design Overview

- What is Taro?
  - o Proof based bearer asset issuance+transfer system built on Bitcoin
    - An asset is a proof explicit (today) starting from a "genesis" asset, all rules were followed properly leading to final unspent asset output
    - f(prevAsset, assetWitness) -> newAsset
    - assetIDs generated via trick w/ BIP 34 (ensures coinbase uniqueness)

```
assetID = sha256(
    genesisOutpoint || sha256(tag) ||
    sha256(meta) || outputIndex || assetType
)
```

- assetType = Normal | Collectible
- Light client friendly! Normal assets can be sent using LN!
   Leverages taproot, w/o off-chain data Taro transactions indistinguishable for normal transactions! (censorship resistance++)
- o Initial VM: Tapscript VM
- Assets to committed in Merkle-Sum Sparse Merkle Tree rooted in tapscript leaf
  - Enables easy supply verification ("run the numbers")
  - Application layer composition via swaps (exclusion proof for collectible, etc)

# Taro - Asset Proofs Today

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# zk-Taro - Succinct Taro Proofs via Recursive STARKs

- Reduces down to the very same problem as STARK based Bitcoin blockchain sync
  - o f(prevAsset, witness) -> newAsset
  - o f(prevTaroRoot, witness) -> newTaroRoot
- Two layers of proofs, then recursion: <a>ट्</a>
  - Inclusion:
    - "There exists a valid block header, with a merkle tree root that commits to a transaction, that itself commits to a valid Taro root within the pkscript of an output, and that Taro root contains an asset with attributes..."
  - State transition validity:
    - "The asset contains a valid witness based on public inputs ZZZ based on rule set VVV"
  - o Recurse:
    - "Each of those inputs also has a valid inclusion + state transition validity proof...."
- End result is a single proof that itself is the asset
  - Each new transition feeds prior proof into recursion layer with new transition
- TARO is developer-facing rather than consumer-facing. Ordinary consumers are unlikely ever to see the TARO mark at all. As I made clear in my talk, TARO is a protocol that will govern transactions on the Bitcoin blockchain—neither the protocol itself nor the TARO name are visible to the ordinary consumers engaging in a transaction itself. This is the same as how ordinary consumers send and receive email every day without encountering the names of protocols like IMAP or SMTP that govern how emails are actually sent and received by the underlying servers that power internet communications.
- 38. The diagram displayed below, from a slide I used during my April 6, 2022 presentation, depicts the use of the TARO protocol to facilitate the transfer and exchange of U.S. dollars ("USD") into bitcoin ("BTC") and then an exchange back into USD. At no point in those transactions would any of the senders or recipients see the name "TARO"—they would simply see USD and BTC.

# How does Taro work on LN? Assets at the Edges: - LN "core" doesn't know about assets at all, routers see normal Bitcoin transactions - Instead, assets exist only at the edges, the "leaf nodes" - Enables us to retain the existing network effect: 3.7k+ BTC already on LN · Asset transfer use Bitcoin as the backbone monetary rail · more demand for transfers -> more routing activity -> more fee revenue -> network grows and becomes more useful S10 Alice Lightning Network Backbone BTC Laghtning Network BTC

- 39. Based on my understanding of blockchain technologies, the nature of the TARO protocol, the sophisticated nature of the Bitcoin developer community working on TARO, and the blockchain protocol purportedly offered by Tari Labs, I believe it is virtually impossible that any actual user of the TARO protocol could confuse TARO with TARI.
- 40. I am not aware of any instances of anyone actually confusing TARO with TARI, or vice versa. Culturally, in the Bitcoin community, highly technical and sophisticated developers would never confuse a Bitcoin project with projects in other blockchain communities. Bitcoin developers are focused on Bitcoin; they don't follow or focus on projects on other blockchains. And even to the extent they are aware of developments in the broader crypto space, Bitcoin developers are known to be obsessed with precision.
- 41. I was informed of the Court's recent order to preserve the status quo in this case on the day it was issued. In order to ensure that Lightning Labs complied with the Court's order, we had to change significant aspects of our software development process. As I mentioned above, all development and coding for the TARO protocol has happened entirely in public since the software was made open-source in September 2022. I had to work late into the evening to set up a private repository with a copy of the TARO code basis

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and contact Lightning Labs developers who are located in multiple time zones worldwide to inform them of the new private code repository. In order to ensure that Lightning Labs complies with the intention of the Court's order, I have also informed our developers that we are currently unable to work with external contributors to the TARO code base, deal with bug reports or feedback on the TARO code that is submitted on the public Github page, or code out in the open as we normally do.

- 42. Compliance with the Court's order is highly disruptive to our ordinary software development process and Lightning Labs cannot easily comply with the terms of that order and continue work on the open-source, publicly available TARO project. I am also concerned about morale among Lightning Labs employees given this significant change to the way we ordinarily work and do business. Working in a private code repository is a total departure from our typical style of coding on a project like this.
- 43. Complying with the Court's order is also causing us significant reputational harm, as it appears that Lightning Labs has ceased all work on the TARO project to the broader developer community that has been aware of and contributing to the TARO code base on Github. We have been doing continuous testing with third-party developers, consistent with the open-source nature of the TARO project, and we have halted all such work out of an abundance of caution to ensure we are complying with the Court's order.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed this 27<sup>th</sup> day of February 2023, in San Francisco, California.



Olaoluwa Osuntokun